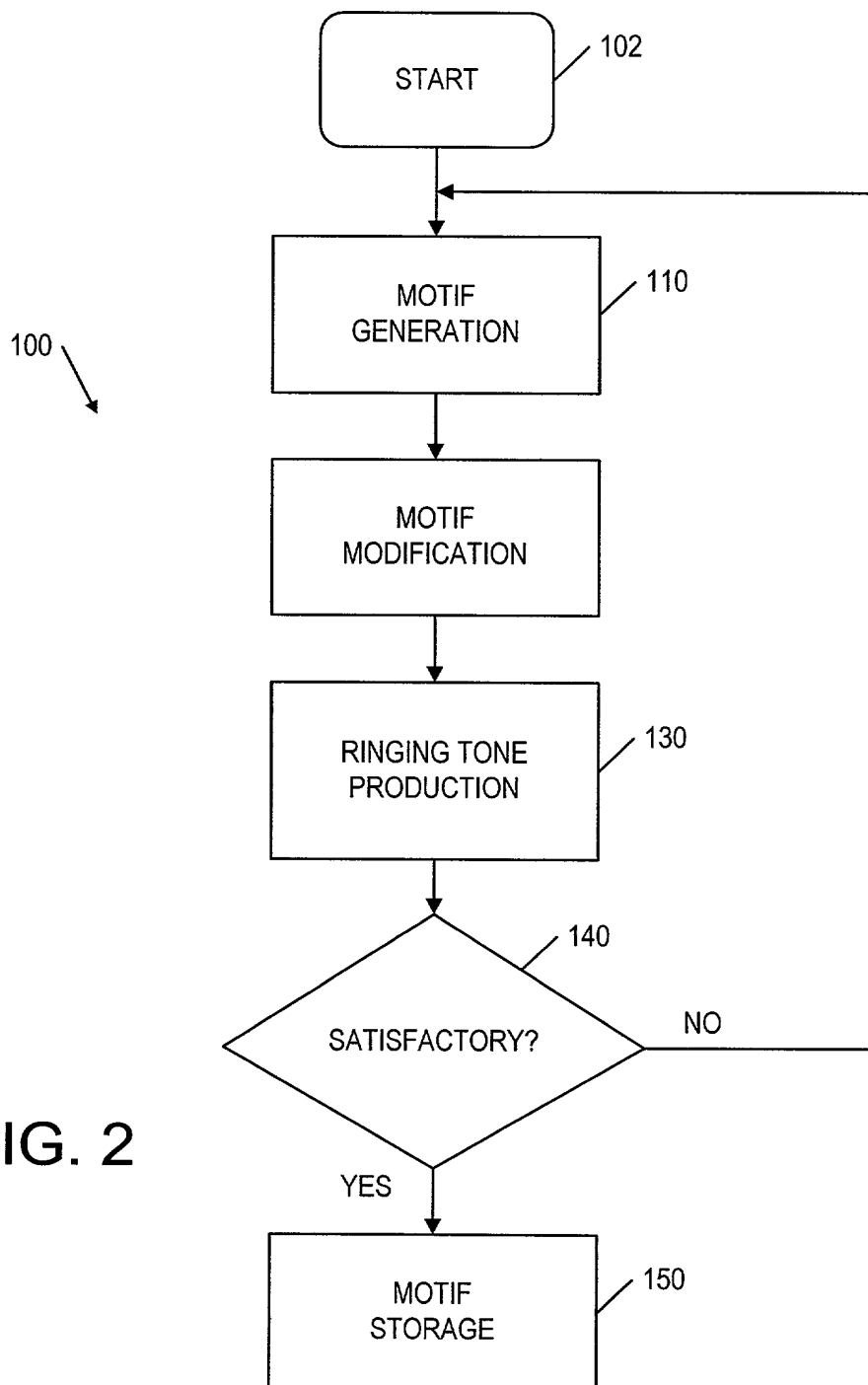


FIG. 1



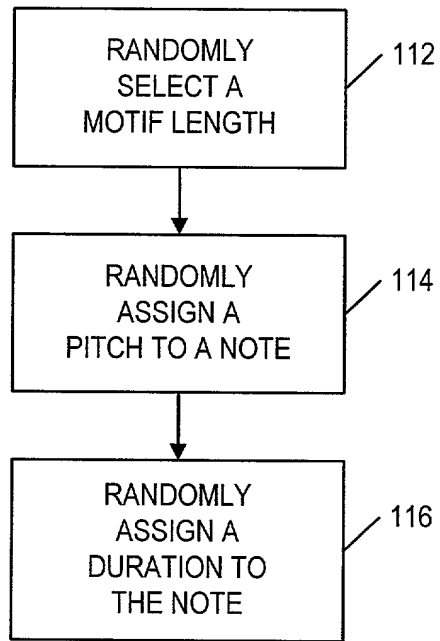


FIG. 3

```

from mid import *
import random

## The tst(leng,filename) function is the "main",
## calling it executes the program and generates
## musical data
## Program is based on the idea of repeated
## motive, which may include simple motives and
## and which can be transformed pitchwise and
## rhythmically

## ABOUT DATA STRUCTURES:
## Two simple array-like lists are used to store
## the starting points (from previous notes) and
## and the pitches of the notes. It is necessary
## to be able to insert and delete from these
## lists
## These lists are initialized in the tst-
## function and after that modified using several
## processing functions

def tst(leng,filename):
##Initialization of the motives and several
## control parameters like initial motive length
    mym = midilist()
    mym.filename = filename
    motive = []
    transform = []
    rhythm = []

## Motive transformation data-list
## initialization, data is stored pairwise
## first representing the transformation
## maximum and second in pair the transformation
## amount

```

FIG. 4a

```

transfolen = random.randint(1,3)
transfotem,transfomodtem = 0,0
for n in range(transfolen):
    transfotem = random.randint(-2,3)
    transfomodtem = random.randint(-4,4)
    transform.insert(0,transfotem)
    transform.insert(0,transfomodtem)

## More control parameters, motive lenght, whole
## piece transposition and non-legatones
motilen = random.randint(2,7)
transpo = random.randint(-12,12)
transpo = 0
randura = random.randint(1,5)

motitem = 4
startp = 0
duratio = 12

## Actual motive and rhythm initialization
for n in range(motilen):
    motitem = random.randint(0,24)
    motive.insert(0,motitem)

## Rhythmic motive (rhythmo) initialization, it
## is assumed that 96 is something like
## 100 - 200 milliseconds, this has to be
## adjusted using some testing system in the
## real version
## Smaller note values are more probable
for n in range(motilen):
    motitem = random.randint(0,6)
    if motitem == 0:
        rhythmo.insert(0,48)
    if motitem == 1:
        rhythmo.insert(0,96)

```

FIG. 4b

```

        if motitem == 2:
            rhythm.insert(0,36)
        if motitem > 2:
            rhythm.insert(0,24)

## several modifying functions may be called in
## following lines, these functions could be
## switched on or off, if the user would like
## switching mechanism not yet implemented
    rhythm,motive = motivetrills(rhythm,motive)
    rhythm = nonmechanizer(rhythm)
    print rhythm
    motive = motiverulelessamenes(motive)
    motive = diatonicer(motive)
    motive = motiverules(motive)

## The motive lenght may be changed because of
## transformations, so the "motilen" variable is
## updated:
    motilen = len(motive)
## Main generation loop, processed motive is read
## several times and simultaneously modified
## using transform-system
    for n in range(leng):
        ###TRANSFORMATION FLAG HERE!!!
## if n % 4 == transform[0] % 4:
    if n % motilen == abs(transform[0]):
        motive[n % motilen] = motive[n %
motilen] + transform[1]
        if motive[n % motilen] > transform[0]:
            motive[n % motilen] = motive[n %
motilen] - 12
        if motive[n % motilen] < transform[0]:
            motive[n % motilen] = motive[n %
motilen] + 12

```

FIG. 4c

```

## we test the motive after transformation so as
## to make it more "beautiful"
    motive = motiverules(motive)
    pitch = motive[n % motilen]
    rhyth = rhythm[n % motilen]

## Following statement is the output-statement,
## by replacing it with ringdata.h type
## outputter, proper data type for output may be
## obtained
    mym.putdata(startp,144,pitch + 79 +
transpo,64,duratio)

## print startp,pitch,duratio
## Following three lines updates the starting
## points and calculates suitable note durations
## non-legato playing) with not too clever way
    startp = startp + (rhyth / 2)
    duratio = rhythm[(n + 1) % motilen] / 2
    duratio = duratio - randura
    if duratio < 6:
        duratio = 6
    if duratio == 10 :
        duratio = 9

## midi-routines, do not care
    mym.calcdelta()
    mym.putmidi()

## print mym.filename, ' - done'

## This function is a heuristic interval
## corrector, which tries to prohibit bad
## sounding intervals like tritonus and sevenths
## This function returns the transformed motive

```

FIG. 4d

```

def motiverules(motive):
    k,intv,na,nb = 1,0,0,0
    while k < len(motive):
        na = motive[k - 1]
        nb = motive[k]
        if na - nb == -6:
            nb = nb + 1
            motive[k] = nb
        if na - nb == 6:
            nb = nb - 1
            motive[k] = nb

        if na - nb == -10:
            nb = nb + 2
            motive[k] = nb
        if na - nb == 10:
            nb = nb - 2
            motive[k] = nb

        if na - nb == -11:
            nb = nb + 1
            motive[k] = nb
        if na - nb == 11:
            nb = nb - 1
            motive[k] = nb
        k = k + 1
    return motive

def diatonicer(motive):
    scale = []
    k,intv,na,nb = 1,0,0,0
    tmp,carryflag,protopos = 0,0,0
    majorproto = scaleproto

    while k < len(motive):
        na = motive[k]
        if na % 12 == 3 or na % 12 == 1 or na %
12 == 6 or na % 12 == 8 or na % 12 == 10:

```

FIG. 4e


```

        na = na - 1
        motive[k] = na
        k = k + 1
    return motive

## This function makes small random inaccuracies
## for the playing to get more "natural" feeling
def nonmechanizer(rhythmo):
    k,intv,na,nb = 1,0,0,0
    while k < len(rhythmo):
        na = rhythmo[k]
        na = na + random.randint(-3,14)
        rhythmo[k] = na
        k = k + 1
    return rhythmo

## This rule prohibits successive identical
## intervals, this is necessary, because they
## sound bad in faster tempi
def motiverulesamenes(motive):
    k,intv,na,nb = 1,0,0,0
    while k < len(motive):
        na = motive[k - 1]
        nb = motive[k]
        if na - nb == 0:
            nb = random.randint(0,24)
            motive[k] = nb
        k = k + 1
    return motive

## This system changes long note values (i.e. 96)
## to series of alternating pitches
## The series may have its own pitch
## transformation
## the lenght of both motive and rhythmo may be
## changed in a non-foreseeable way
def motivetrills(rhythmo,motive):
    k,kk,intv,na,nb,np = 0,0,0,0,0,0

```

FIG. 4f

```

transfo = random.randint(0,4)
transfob = random.randint(0,4)
transforva = random.randint(-4,4)
transforvab = random.randint(-4,4)
trillen = random.randint(2,16)

while k < len(rhythmo):
    na = rhythmo[k]
    nb = motive[k]
    np = motive[(k + 1) % len(motive)]
    k = k + 1
    if na == 96:
        rhythmo.remove(96)
        motive.remove(nb)
        for kk in range(trillen):
            rhythmo.insert(k,12)
            if kk % 2 == 0:
                if transfo == 3:
                    motive.insert(k,nb +
transforva)

                if transfo < 3:
                    motive.insert(k,nb)
                if transfo == 4:
                    motive.insert(k,nb -
transforva)

            if kk % 2 == 1:
                if transfob == 3:
                    motive.insert(k,np +
transforvab)

                if transfob < 3:
                    motive.insert(k,np)
                if transfob == 4:
                    motive.insert(k,np -
transforvab)
    return rhythmo,motiv
tst(165,'mecal.mid')

```

FIG. 4g